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U.S. DEPARTMENT OF COMMERCE PATENT AND TRADEMARK OFFICE ATTORNEY'S DOCKET NUMBER

**TRANSMITTAL LETTER TO THE UNITED STATES
DESIGNATED/ELECTED OFFICE (DO/EO/US)
CONCERNING A FILING UNDER 35 U.S.C. 371**

WI. 1706PCT-US
U.S. APPLICATION NO. 01/26903 (35 U.S.C. 371)
10/089071

INTERNATIONAL APPLICATION NO. PCT/DE00/03489	INTERNATIONAL FILING DATE 5 October, 2000	PRIORITY DATE CLAIMED 8 October 1999
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TITLE OF INVENTION

CYLINDER FOR A ROTARY PRESS

APPLICANT(S) FOR DO/EO/US

SCHNEIDER, Georg; HEMMELMANN, Armin, Alois

Applicant herewith submits to the United States Designated/Elected Office (DO/EO/US) the following items and other information:

1. ☒ This is a **FIRST** submission of items concerning a filing under 35 U.S.C. 371.
 2. ☐ This is a **SECOND** or **SUBSEQUENT** submission of items concerning a filing under 35 U.S.C. 371.
 3. ☒ This express request to begin national examination procedures (35 U.S.C. 371(f)) at any time rather than delay examination until the expiration of the applicable time limit set in 35 U.S.C. 371(b) and PCT Articles 22 and 39(1).
 4. ☒ A proper Demand for International Preliminary Examination was made by the 19th month from the earliest claimed priority date.
 5. ☒ A copy of the International Application as filed (35 U.S.C. 371(c)(2))
 - a. ☒ is transmitted herewith (required only if not transmitted by the International Bureau).
 - b. ☐ has been transmitted by the International Bureau.
 - c. ☐ is not required, as the application was filed in the United States Receiving Office (RO/US)
 6. ☒ A translation of the International Application into English (35 U.S.C. 371(c)(2)).
 7. ☒ Amendments to the claims of the International Application under PCT Article 19 (35 U.S.C. 371(c)(3))
 - a. ☐ are transmitted herewith (required only if not transmitted by the International Bureau).
 - b. ☐ have been transmitted by the International Bureau.
 - c. ☐ have not been made; however, the time limit for making such amendments has NOT expired.
 - d. ☒ have not been made and will not be made.
 8. ☐ A translation of the amendments to the claims under PCT Article 19 (35 U.S.C. 371(c)(3)).
 9. ☒ An oath or declaration of the inventor(s) (35 U.S.C. 371(c)(4)).
 10. ☒ A translation of the annexes to the International Preliminary Examination Report under PCT Article 36 (35 U.S.C. 371(c)(5)).
- Items 11. to 16. below concern other document(s) or information included:
11. ☒ An Information Disclosure Statement under 37 CFR 1.97 and 1.98.
 12. ☒ An assignment document for recording. A separate cover sheet in compliance with 37 CFR 3.28 and 3.31 is included.
 13. ☒ A **FIRST** preliminary amendment.
☐ A **SECOND** or **SUBSEQUENT** preliminary amendment.
 14. ☒ A substitute specification.
 15. ☐ A change of power of attorney and/or address letter.
 16. ☒ Other items or information:
 - A) **Six (6) sheets of formal patent drawings**
 - B) **WO 01/26903, published April 19, 2001**
 - C) **International Search Report mailed March 26, 2001, with translation**
 - D) **Written Notification mailed October 25, 2001; with translation**
 - E) **Response by KBA dated October 31, 2001, with translation**
 - F) **International Preliminary Examination Report, mailed December 10, 2001, with translation**

U.S. APPLICATION NO. (if known) 37 CFR 1.53

10/089071

INTERNATIONAL APPLICATION NO.

PCT/DE00/03489

ATTORNEY'S DOCKET NUMBER

WI-1706PCT-US

21. ☒ The following fees are submitted:**BASIC NATIONAL FEE (37 CFR 1.492 (a) (1) - (5)):**

Neither international preliminary examination fee (37 CFR 1.482)
nor international search fee (37 CFR 1.445(a)(2)) paid to USPTO
and International Search Report not prepared by the EPO or JPO \$1040.00

International preliminary examination fee (37 CFR 1.482) not paid to
USPTO but International Search Report prepared by the EPO or JPO \$890.00

International preliminary examination fee (37 CFR 1.482) not paid to USPTO
but international search fee (37 CFR 1.445(a)(2)) paid to USPTO \$740.00

International preliminary examination fee (37 CFR 1.482) paid to USPTO
but all claims did not satisfy provisions of PCT Article 33(1)-(4) \$710.00

International preliminary examination fee (37 CFR 1.482) paid to USPTO
and all claims satisfied provisions of PCT Article 33(1)-(4) \$100.00

ENTER APPROPRIATE BASIC FEE AMOUNT =

CALCULATIONS PTO USE ONLY

\$ 890.00

Surcharge of \$130.00 for furnishing the oath or declaration later than ☐ 20 ☐ 30
months from the earliest claimed priority date (37 CFR 1.492(e)).

\$

CLAIMS

NUMBER FILED

NUMBER EXTRA

RATE

\$

Total claims

20 - 20 =

0

x \$18.00

\$

Independent claims

2 - 3 =

0

x \$84.00

\$

MULTIPLE DEPENDENT CLAIM(S) (if applicable)

+ \$280.00

\$

TOTAL OF ABOVE CALCULATIONS =

\$890.00

☒ Applicant claims small entity status. See 37 CFR 1.27. The fees indicated above
are reduced by 1/2.

+

\$

SUBTOTAL =

\$890.00

Processing fee of \$130.00 for furnishing the English translation later than ☐ 20 ☐ 30
months from the earliest claimed priority date (37 CFR 1.492(f)).

\$

TOTAL NATIONAL FEE =

\$890.00

Fee for recording the enclosed assignment (37 CFR 1.21(h)). The assignment must be
accompanied by an appropriate cover sheet (37 CFR 3.28, 3.31). \$40.00 per property +

\$

40.00

TOTAL FEES ENCLOSED =

\$930.00

Amount to be
refunded:

\$

charged:

\$

- a. ☒ A check in the amount of \$ **930.00** to cover the above fees is enclosed.
- b. ☐ Please charge my Deposit Account No. _____ in the amount of \$ _____ to cover the above fees.
A duplicate copy of this sheet is enclosed.
- c. ☒ The Commissioner is hereby authorized to charge any additional fees which may be required, or credit any
overpayment to Deposit Account No. **10-1213**. A duplicate copy of this sheet is enclosed.
- d. ☐ Fees are to be charged to a credit card. **WARNING:** Information on this form may become public. Credit card
information should not be included on this form. Provide credit card information and authorization on PTO-2038.

NOTE: Where an appropriate time limit under 37 CFR 1.494 or 1.495 has not been met, a petition to revive (37 CFR
1.137 (a) or (b)) must be filed and granted to restore the application to pending status.

SEND ALL CORRESPONDENCE TO:

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SIGNATURE

Douglas R. Hanscom
NAME

26,600
REGISTRATION NUMBER

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of)
Georg SCHNEIDER)
Armin Alois HEMMELMANN)
Application No. : To Be Assigned)
Filed : April 8, 2002)
For : CYLINDER FOR A ROTARY PRESS)

PRELIMINARY AMENDMENT

Honorable Assistant Commissioner for Patents
Washington, D.C. 20231

Sir:

Please amend the above-identified patent application, as set forth in the verified translation of the German language text of PCT/DE00/03489, filed October 5, 2000; published as WO 01/26903 on April 19, 2001 and claiming priority to DE 199 48 453.8 filed October 8, 1999, prior to examination of the application on its merits, and prior to the calculation of the filing fee, as follows:

IN THE SPECIFICATION

Please cancel the entire specification of the subject application, as set forth in the verified translation of PCT/DE00/03489, including the parts list, in favor of the accompanying Substitute Specification. A marked-up copy of the verified translation, showing the changes made thereto to arrive at the substitute specification, is enclosed for the Examiner's review. Those changes include the addition of suitable section

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headings, the deletion of references to claims, the addition of a discussion of a prior art document as was done in the PCT application, and the correction of minor errors in phrasing and punctuation. It is believed that none of these changes constitute new matter.

IN THE ABSTRACT

Please add the Abstract of The Disclosure, as set forth on the separate accompanying sheet. The Abstract is generally similar to the abstract which is part of the published PCT application, WO 01/26903. No new matter is being added by the presentation of the abstract.

IN THE CLAIMS

Please cancel claims 1-14, all of the claims set forth in the verified translation of the German language text of PCT/DE00/03489. Please substitute therefor new claims 15-34 as follows:

15. (New) A cylinder of a rotary printing press comprising:
 - a cylinder base body having a circumference;
 - a cylinder outer body supported on, and spaced from said cylinder base body;

a flow path, through which a tempering medium can flow, and being defined by said cylinder base body circumference and said cylinder outer body, said circumference having a multiplex-threaded, spiral shaped conduit, said cylinder outer body conducting printing ink.

16. (New) The cylinder of claim 15 further including strips on said cylinder base body circumference, said strips supporting said cylinder outer body on said cylinder base body.

17. (New) The cylinder of claim 15 wherein said conduit is octuply-threaded.

18. (New) The cylinder of claim 15 wherein said conduit has a first cross-sectional area and further wherein said cylinder outer body has a shell surface having a second cross-sectional area and wherein a ratio of said first and second cross-sectional areas is in the range of 1:1200 to 1:1600.

19. (New) The cylinder of claim 16 wherein said strip has a first width and further wherein said cylinder outer body has a wall thickness, and wherein a ratio of said first width to said wall thickness is less than or equal to 2.

20. (New) The cylinder of claim 19 wherein said ratio of said first width to said wall thickness is less than or equal to 1.5.

21. (New) A cylinder of a rotary printing press comprising:

a cylinder base body having a circumference;

a cylinder outer body spaced from said cylinder base body and having a shell surface; and

an axially extending gap defined by said spaced cylinder base body and said cylinder outer body and through which a tempering medium can flow, said gap having a generally circular profile, said gap having a cross-section, said shell surface having a shell surface area, a ratio of said gap cross-section to said shell surface area being between 1:200 and 1:600.

22. (New) The cylinder of claim 21 wherein said cylinder base body and said cylinder outer body are unsupported by each other.

23. (New) The cylinder of claim 21 wherein said ratio is between 1:300 and 1:500.

24. (New) The cylinder of claim 21 wherein said gap has a gap clearance of between 2 to 5 mm.

25. (New) The cylinder of claim 15 further including a supply line and a removal line for said tempering medium.
26. (New) The cylinder of claim 21 further including a supply line and a removal line for said tempering medium.
27. (New) The cylinder of claim 25 further including at least one journal for supporting said cylinder, said supply line and said removal line being coaxially arranged in said journal.
28. (New) The cylinder of claim 26 further including at least one journal for supporting said cylinder, said supply line and said removal line being coaxially arranged in said journal.
29. (New) The cylinder of claim 15 wherein said cylinder is an inking roller.
30. (New) The cylinder of claim 21 wherein said cylinder is an inking roller.
31. (New) The cylinder of claim 15 wherein said cylinder is an screen roller.
32. (New) The cylinder of claim 21 wherein said cylinder is an screen roller.

33. (New) The cylinder of claim 15 wherein said cylinder outer body has a wall thickness and an axial length and further wherein a ratio of said wall thickness to said axial length is in a range of 1:200 to 1:1200.

34. (New) The cylinder of claim 33 wherein said range is between 1:400 and 1:1000.

REMARKS

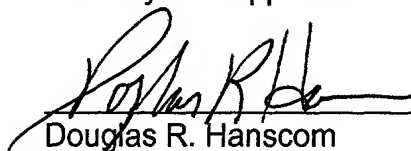
The specification of the subject patent application, as set forth in the verified translation of the German language text of PCT/DE00/03489, has been cancelled in favor of the accompanying Substitute Specification. A suitable Abstract has been added. Original claims 1-14 have been cancelled in favor of new claims 15-34. These new claims are similar in content to the claims now pending in the PCT application and have been re-written to avoid multiple dependencies and to generally place them in a form more in accordance with U.S. practice. No new matter is being added. Entry of this Preliminary Amendment into the file of the subject patent application prior to the

calculation of the filing fee, and prior to an examination of the application on the merits
is respectfully requested.

Respectfully submitted,

Georg SCHNEIDER et al.
Applicants

JONES, TULLAR & COOPER, P.C.
Attorneys for Applicants



Douglas R. Hanscom

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April 8, 2002
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Attorney Docket: W1.1706PCT-US

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ABSTRACT OF THE DISCLOSURE

A cylinder, such as an inking roller for a printing press, includes a base body and an outer body. A tempering medium can flow in a gap between the base body and the outer body. The base body has a circumference which includes grooves that define a multiple helical channel for the tempering medium. The outer body is supported by the base body of the cylinder.

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Cylinder for a Rotary Press

FIELD OF THE INVENTION

[001] The present invention relates to a cylinder for a rotary press . The cylinder includes a base body and an outer body. A tempering medium can flow between the two bodies

DESCRIPTION OF THE PRIOR ART

[002] A temperable cylinder for a rotary printing press is known from DE 197 12 446 A1. A heat exchanger consisting of several tubes is arranged inside a hollow chamber of the cylinder and in turn is surrounded by a heat-transferring stationary fluid.

[003] EP 0 557 245 A1 discloses a temperable forme cylinder with a clamping conduit extending axially over the jacket surface. Conduits extending axially in respect to the cylinder have been cut into the cylinder in the vicinity of the periphery, through which coolant flows.

[004] EP 0 733 478 B1 shows a friction roller embodied as a tube, wherein coolant flows through the entire hollow space between an axial conduit, through which coolant is conducted, and the tube.

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[005] A temperable double-jacket drying cylinder is known from DE-PS 929 830.

Steam flows in the space between an outer jacket and an inner jacket, into which ribs have been cut in a spiral pattern.

[006] EP 0 652 104 A1 discloses a cylinder which is provided with interior cooling to prevent the build-up of ink. For this purpose, coolant flows through an annular gap, in which spiral-shaped guide plates can also be arranged for improving the circulation.

SUMMARY OF THE INVENTION

[007] The object of the present invention is directed to providing a cylinder of a rotary printing press.

[008] In accordance with the present invention, this object is attained by providing the cylinder with a cylinder base body and a cylinder outer body. A tempering medium can flow between the base body and the outer body. A circumferential surface of the base body has a spiral-shaped conduit, and the outer body has an inner surface. These two surfaces define the tempering medium flow path .

[009] The advantages which can be achieved by the present invention lie

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primarily in that a temperable cylinder can be produced in a cost-effective manner from simple components. Because of this, a pre-selectable temperature is achieved, which is almost evenly distributed over the entire jacket surface of the cylinder. A temperature profile which fluctuates in the circumferential direction of the cylinder or which is uneven, such as can occur, for example, in connection with individual axially extending conduits and/or with wall thicknesses which are too small in comparison with the distance of the conduits, is avoided.

[010] In an advantageous embodiment, a chamber, through which a tempering medium is conducted, is of such dimensions in the radial direction on the inside of the cylinder jacket, that a forced flow also takes place directly on the jacket surface.

[011] A low wall thickness of the outer body separating the jacket surface and the tempering medium is particularly advantageous in respect to the fastest possible reaction time of the tempering process, for example for inking rollers, in particular screen or anilox rollers, or for forme, transfer or satellite cylinders without a device for fastening dressings, such as bracing or clamping conduits, extending radially into the interior of the jacket surface.

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[012] In a preferred embodiment of the present invention, a wall thickness of a temperable forme or transfer cylinder having one or several clamping or bracing conduits on its shell surface is so great that the clamping conduit comes to lie entirely inside the wall.

[013] Tempering which is even in the circumferential and in the axial directions is achieved by use of a tempering medium flowing in the axial direction through a narrow gap between the outer body and the base body of the cylinder on the entire circumference.

[014] In a further advantageous embodiment, an even more strongly directed flow is generated by use of a groove extending spirally on the outer surface of the base body.

[015] Cooling, by use of the above mentioned spiral conduit, is furthermore advantageous, in particular for screen or anilox rollers, wherein the outer body is supported on the strips and is therefore constructed with thin walls.

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BRIEF DESCRIPTION OF THE DRAWINGS

[016] Preferred embodiments of the present invention are represented in the drawings and will be described in greater detail in what follows:

[017] Shown are in:

Fig. 1, a longitudinal sectional view through a temperable cylinder, which has a device for fastening a dressing and with a spirally extending conduit,

Fig. 2, a cross section through a temperable cylinder in accordance with Fig. 3,

Fig. 3, a longitudinal sectional view through a temperable cylinder, which has a device for fastening a dressing and with a gap between the base body and the outer body,

Fig. 4, a longitudinal sectional view through a temperable, thin-walled cylinder with a spirally extending conduit,

Fig. 5, a cross section through a temperable cylinder in accordance with Fig. 4, and in

Fig. 6, a longitudinal sectional view through a temperable cylinder with a

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gap between the base body and the outer body.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

[018] A temperable cylinder 01 of a printing press, in particular of a rotary printing press, has a cylinder base body 02, for example of a tube-shape or solid, which is surrounded by an outer cylinder body 03 of a circular cross section, for example a tube 03.

[019] On its ends, the cylinder base body 02 is fixedly connected with respective journals 04, 06, which journals 04, 06 are rotatably seated, by means of bearings 07, in lateral frames 08, 09. It is possible to connect one of the journals 04, 06, for example the right journal 06, with a drive motor or with a drive wheel, not specifically represented, fixed in place on the frame.

[020] The other journal 04 has an axial bore 11, which receives a conduit 12 that forms the supply line 12 for a liquid or a gaseous tempering medium, such as, for example, CO₂, water, oil, etc. In an advantageous embodiment, the axial bore 11 of the journal 04 has an interior diameter d11 which is greater than an exterior diameter d12 of the supply line or conduit 12. Therefore, a removal line 13 of a circular cross section

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remains open in the area of the journal 04 and around the supply line or conduit 12, through which the tempering medium leaves the cylinder 01, again via the journal 04.

The supply line or conduit 12 for supplying the tempering medium extends from the left journal 04 axially through the cylinder base body 02 as far as the right journal 06 and terminates in radially outwardly extending bores 14. The bores 14 terminate in a distributing chamber 16, which chamber 16 extends around the entire circumference on an inside surface of the outer cylinder body 03. From the distributing chamber 16, the tempering medium flows in the axial direction A through at least one distribution conduit 17 arranged between the cylinder base body 02 and the outer cylinder body 03 back to the left journal 04, where it terminates in a collecting chamber 18 and is received in the annular removal line 13 via radially inwardly extending bores 19.

[021] The supply line 12 and the removal line 13 are connected with removal and supply connections of a tempering device, in a manner not specifically represented in the drawings.

[022] It is possible, in an embodiment variation, not specifically represented, to provide the supply and removal of the tempering medium separately via the respective

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journals 04, 06.

[023] In a first preferred embodiment, as seen in Fig. 1, the cylinder 01 is embodied as a forme cylinder 01 or as a transfer cylinder 01 which, on a shell surface 21 of the outer cylinder body 03, has at least one fastening device 22, for example a bracing conduit 22, a magnet close to the shell surface, or another fastening device 22, extending axially in respect to the cylinder 01, for fastening a dressing or a cover, for example a printing forme or a rubber blanket to the cylinder 01. A wall thickness h_{03} of the outer cylinder body 03 is greater than a depth h_{22} of the bracing conduit 22, as seen in Fig. 2, so that an uninterrupted and circular inner surface 23 is formed on the inside of the outer cylinder body 03, which makes possible a cost-effective construction and above all even tempering. The wall thickness h_{03} has a range of, for example, between 40 and 70 mm, in particular between 55 and 65 mm. The depth h_{22} of the bracing conduit 22 lies between 20 and 45 mm. In Figs. 1 and 2, two bracing conduits 22 are provided in the circumferential direction of the cylinder 01, however, the upper bracing conduit 22 is shown in dashed lines for reasons of clarity.

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[024] In this first preferred embodiment, the distribution conduit 17 is embodied as a spiral groove 17 in the axial direction A on a circumference 24 of the cylinder base body 02. This spirally turning groove 17 of a width b17 and a depth h17 is covered by the outer cylinder body 03, for example by having body 03 shrunk on. The inner surface 23 of the outer cylinder body 03 rests on a protrusion 26 forming the groove 26, for example a strip 26 of a width b26.

[025] The distribution conduit or spiral groove 17 is connected, at its start 27, with the distributing chamber 16 and at its end with the collecting chamber 18. The distributing chamber 16 and the collecting chamber 18 are, for example, each designed as an annular groove 16, 18, each of which is formed by a shoulder on the circumference of the area of the journals 04, 06 near the cylinder base body and a front face of the cylinder base body 02, and is also covered by the outer cylinder body 03.

[026] In the case of a forme cylinder 01 of double-sized circumference, i.e. two printing formats in the circumferential direction, the diameter of the forme cylinder 01 is, for example, between 320 and 400 mm, in particular 360 to 380 mm.

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[027] The depth h_{17} and width b_{17} of the distribution conduit or groove 17, as well as the width b_{26} of the strip 26, and the number of distribution conduits 17 determine the flow-through amount of tempering medium per unit of time, and alternately the required pressure as well as the lead of the spiral groove 17, and therefore the tempering behavior.

[028] In an advantageous embodiment, the circumference 24 of the cylinder base body 02 has several, for example four or eight, distribution conduits or grooves 17 starting in the distributing chamber 16 and ending in the collecting chamber 18. The starts 27 and ends 28 of each of these distribution conduits 17 are offset by 90° or 45° in the circumferential direction. In this way, with the same conduit geometry a multiplex-threaded, for example quadruply- or octuply-threaded groove 17, has an increased total cross section Q , i.e. the sum of the cross sections of the individual distribution conduits 17, and an increased lead S , and therefore also a reduced flow path and lesser pressure loss.

[029] In the example, the circumference 24 of the cylinder base body 02 has a quadruply-threaded distribution conduit 17, wherein the width b_{17} of the distribution

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conduit or groove 17 respectively lies between 10 and 20 mm, for example at 15 mm, and the width b_{26} of the strip 26 respectively lies between 3 and 7 mm, for example at 5 mm. The depth h_{17} of the distribution conduit 17 is respectively 10 to 15 mm, for example 12 mm. The quadruply-threaded distribution conduit 17 therefore has a lead S of, for example, 52 to 108 mm, in particular of 80 mm.

[030] A total cross section Q for the flow of the tempering medium is advantageously 600 to 800 mm². If increasing the wall thickness h_{03} of the outer cylinder body 03, while at the same time retaining the cylinder diameter d_{01} and reducing the inner radius r_{17} of the spiral distribution conduit or groove 17, the depth h_{17} of the conduit or groove 17 must be increased at the same ratio as the inner radius r_{17} of the conduit or groove 17 is reduced, so that the total cross section Q remains at least at the order of magnitude, for example greater than or equal to 710 mm². In this way, the supply to, or removal of heat from a shell surface 21 of the forme cylinder 01 remains assured. For the determination of the total cross section Q , the approximate inner radius r_{17} should be applied for depths h_{17} which are small in comparison with the inner radius r_{17} , otherwise as usual the inner radius r_{17} plus half the depth h_{17} .

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The ratio between the tempered shell surface 21 and the total cross section Q lies for example between 1000 and 1800 .

[031] In a second preferred embodiment, as depicted in Fig. 3, of a forme cylinder 01, the distribution conduit 17 is produced, not as a spiral groove 17, but as an open gap 17 with an annular clear profile between the cylinder base body 02 and the outer cylinder body 03. The supply and removal of the tempering medium takes place in the same or similar way as in the first preferred embodiment, shown in Fig. 1 . In place of the radially extending bores 19, 14, the journal 04, 06 is embodied in several pieces and in this way permits the penetration of the tempering medium from the supply line 12 into the distributing chamber 16, or from the collection chamber 18 to the removal line 13. In the second preferred embodiment, the supply line 12 is embodied in a two to four piece manner, wherein a supply conduit 12 penetrating the journal 04 terminates in a conduit leading through the cylinder base body 02.

[032] The clearance h_{17} of the distribution conduit 17, together with an inner radius r_{17} of the rotary shaft of the cylinder 01 on which the distribution conduit is arranged, determines the flow conditions and therefore also the tempering behavior.

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Too narrow a clearance increases the required pressure, or reduces the amount of flow-through, while too large a clearance might not result in the assured direction of the flow directly onto the surface 23 of the outer cylinder body 03 because of high centrifugal forces occurring and friction occurring in the area of the surface 23 in the course of the rotation of the cylinder.

[033] In an advantageous embodiment of a forme cylinder 01, the gap of the distribution conduit 17 is arranged at the inner radius r_{17} of 80 to 120 mm, in particular between 100 and 115 mm. The clearance h_{17} of the gap is between 2 to 5 mm, preferably 3 mm. The wall thickness h_{03} of the outer cylinder body 03 is designed to be between $h_{03} = 40$ mm and $h_{03} = 70$ mm, in particular between 55 and 65 mm. In this embodiment of the tempering device, the outer cylinder body 03 should be designed to be self-supporting over a length l_{01} , for example $l_{01} = 800$ to 1200 mm, of the barrel of the cylinder 01, or a length l_{03} , for example $l_{03} = 800$ to 1200 mm, of the outer cylinder body 03. Thus, with a depth h_{22} of the bracing conduit 22 between 20 and 45 mm, a sufficient strength of the outer cylinder body 03 remains in the area of the bracing conduit 22. As in the first preferred embodiment, the clearance h_{17} of the gap

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should be increased in an advantageous manner at the ratio of a reduction of the inner radius r_{17} if the wall thickness h_{03} is increased and the gap in the distribution conduit 17 is moved further into the interior of the cylinder 01, and vice versa. For example, the total cross section Q lies between 1300 and 3500 mm². The ratio between the shell surface 21 to be tempered and the total cross section Q of the conduit 17 lies, in this embodiment, between 300 and 900, for example, and in particular between 500 and 650. The remaining preferred dimensions of the forme cylinder 01 explained in the first preferred embodiment should also be employed with the second preferred embodiment and will not be stated again.

[034] In third and a fourth preferred embodiments, as shown in Figs. 4 and 6, the cylinder 01 is embodied as a temperable roller 01, for example an inking roller 01, and in particular a screen roller 01 or an anilox roller 01. The supply and removal of the tempering medium, as well as the seating in lateral walls 08, 09 takes place in the same or similar manner as in the first or second preferred embodiments.

[035] In the third preferred embodiment, which is shown in Fig. 4, a spiral-shaped, multiplex-threaded, preferably octuply-threaded, distribution conduit 17 is

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arranged on the circumference 24 of the cylinder base body 03, in the same manner as in the first preferred embodiment. The distributing chamber 16 and the collecting chamber 18 each have eight radial bores 14, 19 and are connected, equidistant in relation to the circumferential direction, with eight starts 27 and eight ends 28 respectively, of the octuply-threaded distribution conduit or conduits 17. In the example, the distribution conduits 17 have been embodied as grooves 17, each with a segment-like, for example with a semicircular profile, for advantageous mechanical and satisfactory flow properties.

[036] The multiplex-threaded distribution conduit 17 is embodied in an advantageous manner as octuply-threaded, since it is possible with the same geometry of the conduit 17 to either conduct twice the amount of tempering medium at a steady pressure loss through the conduit 17, or the same amount of tempering medium at a reduced pressure.

[037] As in the first exemplary embodiment, the groove 17 is covered by the outer cylinder body 03, which is, for example, shrunk on. Tempering, by use of the spiral-shaped distribution conduit or groove 17, is particularly advantageous in case an

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effective and fast reacting tempering of the outer cylinder body 03 is required, such as is represented by ink-conducting inking rollers 01 and screen rollers 01. The less the wall thickness h_{03} of the outer cylinder body 03, as shown in Fig. 5, the faster the reaction on the shell surface 21 takes place in case of a change of the operating temperature. In the example, the outer cylinder body 03 is made with a very small wall thickness h_{03} and is not self-supporting, i.e. it is supported on strips 26. The width of the groove 17 determines the mechanically still permissible wall thickness h_{03} of the outer cylinder body 03, and vice versa. The permissible width b_{26} of the strip 26 and the minimum wall thickness h_{03} determine each other mutually, since a temperature profile on the shell surfaced 21 of the outer cylinder body 03 should be avoided if possible.

[038] In an advantageous embodiment, the temperable roller 01 has a diameter d_{01} between 160 and 200 mm, in particular 180 mm. The wall thickness h_{03} of the outer cylinder body 03 is 1 to 4 mm, for example $h_{03} = 2$ mm (not counting a coating of a total of 200 to 400 μm possibly to be applied), the length l_{03} of the outer cylinder body 03 lies between 800 and 1200 mm. A ratio V between the length l_{03} and the wall

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thickness h_{03} lies, for example, between 1:200 and 1:1200 , in particular between 1:400 and 1:1000 . In the area which acts together with the surface 23 of the outer cylinder body 03, the strip 26 has a width b_{26} of 2 to 4 mm, in particular $b_{26} = 3$ mm.

In the area which acts together with the surface 23 of the outer cylinder body 03, the conduit 17 has a width b_{17} between 8 and 13 mm, in particular 10 to 12 mm. In the example, the profile of the conduit 17 is semicircular-shaped, so that a maximum depth h_{17} of the conduit 17 is 4 to 7 mm, in particular $h_{17} = 5$ mm. The total cross section of the octuply- threaded distribution conduit or conduits 17 comes to 300 to 450 mm², and can be approximately compared to the total cross section Q in the quadruply-threaded first preferred embodiment, if the shell surface 21 to be cooled is taken into consideration. Here, too, an increase of the amount of tempering medium flowing per unit of time and, if possible, of a contact surface of the temperature medium with the surface 23 of the outer cylinder body 03, should at least be kept at an order of magnitude where the geometries of the roller 01 change while the shell surface 21 to be cooled remains the same. The ratio between the shell surface 21 to be tempered and the total cross section Q lies, for example, between 1:1200 and 1:1600 .

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[039] In the fourth preferred embodiment, which is depicted in Fig. 6 , the cylinder 01 embodied as a roller 01 has a gap 17, which is annular in profile, as the distribution conduit 17, in a manner comparable with the second preferred embodiment. As in the third preferred embodiment, the roller 01 has a diameter d_{01} of approximately 160 to 200 mm. The supply and the removal of the tempering medium is designed in accordance with one of the previous preferred embodiments.

[040] In contrast to the third preferred embodiment, the outer cylinder body 03 is embodied to be self-supporting over the length l_{01} of, for example 800 to 120 mm, and has a wall thickness h_{03} of 5 to 20 mm, for example, and in particular of 5 to 9 mm. The clearance h_{17} of the distribution conduit or gap 17 is 2 to 5 mm, preferably 3 mm, wherein the distribution conduit or gap 17 is arranged on an inner radius of 60 to 100 mm, in particular 80 mm. The total cross section Q through which flow occurs lies, for example, between 1000 and 2500 mm², in particular at approximately 1500 mm². The ratio between the shell surface 21 to be tempered and the total cross section Q of the conduit 17 lies, for example, between 200:1 and 600:1 , in particular between 300:1 and 500:1 .

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[041] The roller 01, preferably designed as a screen roller 01, from the third and the fourth preferred embodiments can have profiling on its shell surface 21, such as, for example, ink-conducting small cups. The shell surface 21 of the outer cylinder body 03 can preferably have a chromium-nickel coating and a ceramic coating, each of a thickness of 100 to 200 μm , wherein the latter has the profiling, or the small cups.

[042] It is advantageous for the embodiments of tempering by use of a spiral-shaped conduit 17, to select the ratio between the shell surface 21 to be tempered and the total cross section Q of the distribution conduit 17 between the cylinder base body 02 and the outer cylinder body 03 through which a flow occurs to be less than 1:2000, in particular between 1:1800 and 1:1000. In an advantageous manner, the width b26 of the strip is less than or equal to twice, and in particular one and one half times, the wall thickness h03 of the outer cylinder body 03.

[043] The design of the outer cylinder body 03 is particularly advantageous, wherein it is a thin-walled tube 03 of a wall thickness d03 less than or equal to 5 mm, in particular less than 3 mm, which is mechanically supported on the strips 26, which are spaced apart in the axial direction A.

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[044] The arrangement for tempering represented in the third preferred embodiment can, in an advantageous further development, also be a forme cylinder, which has no fastening device embodied as clamping or bracing conduits, such as is the case, for example, when using printing sleeves in place of printing plates, or with shell surfaces 21 of forme cylinders 01, on which images are directly placed. There, too, a directed, fast reacting tempering in accordance with the third preferred embodiment is then also advantageous.

[045] While preferred embodiments of a cylinder for a rotary printing press in accordance with the present invention have been set forth fully and completely hereinabove, it will be apparent to one of skill in the art that various changes in, for example, the specific type of printing press used, the drive for the cylinders and the like could be made without departing from the true spirit and scope of the present invention which is accordingly to be limited only by the following claims.

WHAT IS CLAIMED IS:

[WO 01/26903]

[PCT/EP00/03489]

MARKED-UP COPY OF SPECIFICATION**SCHNEIDER - W1.1706PCT-US**

[Specification]

Cylinder for a Rotary Press

FIELD OF THE INVENTION

[001] The present invention relates to a cylinder for a rotary press [in accordance with the preamble of claim 1 or 6]. The cylinder includes a base body and an outer body. A tempering medium can flow between the two bodies

DESCRIPTION OF THE PRIOR ART

[002] A temperable cylinder for a rotary printing press is known from DE 197 12 446 A1. A], wherein a] heat exchanger consisting of several tubes is arranged inside a hollow chamber of the cylinder and in turn is surrounded by a heat-transferring stationary fluid.

[003] EP 0 557 245 A1 discloses a temperable forme cylinder with a clamping conduit extending axially over the jacket surface. Conduits], wherein conduits] extending axially in respect to the cylinder have been cut into the cylinder in the vicinity of the periphery, through which coolant flows.

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[004] EP 0 733 478 B1 shows a friction roller embodied as a tube, wherein coolant flows through the entire hollow space between an axial conduit, through which coolant is conducted, and the tube.

[005] A temperable double-jacket drying cylinder is known from DE-PS 929 830. Steam flows in the space between an outer jacket and an inner jacket, into which ribs have been cut in a spiral pattern.

[006] EP 0 652 104 A1 discloses a cylinder which is provided with interior cooling to prevent the build-up of ink. For this purpose, coolant flows through an annular gap, in which spiral-shaped guide plates can also be arranged for improving the circulation.

SUMMARY OF THE INVENTION

[007] The object of the present invention is directed to providing [based on creating] a cylinder of a rotary printing press.

[008] In accordance with the present invention, this object is attained by providing the cylinder with a cylinder base body and a cylinder outer body. A tempering medium can flow between the base body and the outer body. A circumferential surface

of the base body has a spiral-shaped conduit, and the outer body has an inner surface.

These two surfaces define the tempering medium flow path [means of the characteristics of claims 1 or 6].

[009] The advantages which can be achieved by [means of] the present invention lie primarily in that a temperable cylinder can be produced in a cost-effective manner from simple components. Because [By means] of this, a pre-selectable temperature is achieved, which is almost evenly distributed over the entire jacket surface of the cylinder. A temperature profile which fluctuates in the circumferential direction of the cylinder or which is uneven, such as can occur, for example, in connection with individual axially extending conduits and/or with wall thicknesses which are too small in comparison with the distance of the conduits, is avoided.

[010] In an advantageous embodiment, a chamber, through which a tempering medium is conducted, is of such dimensions in the radial direction on the inside of the cylinder jacket, that a forced flow also takes place directly on the jacket surface.

[011] A low wall thickness of the outer body separating the jacket surface and the tempering medium is particularly advantageous in respect to the fastest possible

reaction time of the tempering process, for example for inking rollers, in particular screen or anilox rollers, or for forme, transfer or satellite cylinders without a device for fastening dressings, such as bracing or clamping conduits, extending radially into the interior of the jacket surface.

[012] In a preferred embodiment of the present invention, a wall thickness of a temperable forme or transfer cylinder having one or several clamping or bracing conduits on its shell surface is so great that the clamping conduit comes to lie entirely inside the wall.

[013] Tempering which is even in the circumferential and in the axial directions is achieved by use [means] of a tempering medium flowing in the axial direction through a narrow gap between the outer body and the base body of the cylinder on the entire circumference.

[014] In a further advantageous embodiment, an even more strongly directed flow is generated by use [means] of a groove extending spirally on the outer surface of the base body.

[015] Cooling₁ by use [means] of the above mentioned spiral conduit₁ is furthermore advantageous, in particular for screen or anilox rollers, wherein the outer body is supported on the strips and is therefore constructed with thin walls.

BRIEF DESCRIPTION OF THE DRAWINGS

[016] Preferred [Exemplary] embodiments of the present invention are represented in the drawings and will be described in greater detail in what follows:

[017] Shown are in:

Fig. 1, a longitudinal sectional view through a temperable cylinder, which has a device for fastening a dressing and with a spirally extending conduit,

Fig. 2, a cross section through a temperable cylinder in accordance with

Fig. 3,

Fig. 3, a longitudinal sectional view through a temperable cylinder, which has a device for fastening a dressing and with a gap between the base body and the outer body,

Fig. 4, a longitudinal sectional view through a temperable, thin-walled cylinder with a spirally extending conduit,

Fig. 5, a cross section through a temperable cylinder in accordance with Fig. 4, and in

Fig. 6, a longitudinal sectional view through a temperable cylinder with a gap between the base body and the outer body.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

[018] A temperable cylinder 01 of a printing press, in particular of a rotary printing press, has a cylinder base body 02, for example of a tube-shape or solid, which is surrounded by an outer cylinder body 03 of a circular cross section, for example a tube 03.

[019] On its ends, the cylinder base body 02 is fixedly connected with respective journals 04, 06, which journals 04, 06 are rotatably seated, by means of bearings 07, in lateral frames 08, 09. It is possible to connect one of the journals 04, 06, for example the right journal 06, with a drive motor or with a drive wheel, not specifically represented, fixed in place on the frame.

[020] The other journal 04 has an axial bore 11, which receives a conduit 12 that forms [as] the supply [feed] line 12 for a liquid or a gaseous tempering medium,

such as, for example, CO₂, water, oil, etc. In an advantageous embodiment, the axial bore 11 of the journal 04 has an interior diameter d11 which is greater than an exterior diameter d12 of the supply line or conduit 12. Therefore, a removal line 13 of a circular cross section remains open in the area of the journal 04 and around the supply line or conduit 12, through which the tempering medium leaves the cylinder 01, again via the journal 04. The supply line or conduit 12 for supplying the tempering medium extends from the left journal 04 [almost] axially through the cylinder base body 02 as far as the right journal 06 and terminates in radially outwardly extending bores 14. The bores 14 terminate in a distributing chamber 16, which chamber 16 extends around the entire circumference on an [the] inside surface of the outer cylinder body 03. From the distributing chamber 16, the tempering medium flows in the axial direction A through at least one distribution conduit 17 arranged between the cylinder base body 02 and the outer cylinder body 03 back to the left journal 04, where it terminates in a collecting chamber 18 and is received in [reaches] the annular [ring-shaped] removal line 13 via radially inwardly extending bores 19.

[021] The supply line 12 and the removal line 13 are connected with [the]

removal and supply connections [flow] of a tempering device, in a manner not specifically represented in the drawings.

[022] It is possible, in [provided by] an embodiment variation, not specifically represented, to provide the supply and removal of the tempering medium separately via the respective journals 04, 06.

[023] In a first preferred [exemplary] embodiment, as seen in Fig. 1 [(Fig. 1)], the cylinder 01 is embodied as a forme cylinder 01 or as a transfer cylinder 01 which, on a shell surface 21 of the outer cylinder body 03, has at least one fastening device 22, for example a bracing conduit 22, a magnet close to the shell surface, or another fastening device 22 [other means], extending axially in respect to the cylinder 01, for fastening a dressing or a cover, for example a printing forme or a rubber blanket to the cylinder 01. A [The] wall thickness h03 of the outer cylinder body 03 is greater than a [the] depth h22 of the bracing conduit 22, as seen in Fig. 2, so that an uninterrupted and circular inner surface 23 is formed on the inside of the outer cylinder body 03, which makes possible a cost-effective construction and above all even tempering. The wall thickness h03 has a range of [lies], for example, between 40 and 70 mm, in

particular between 55 and 65 mm. The[, wherein the] depth h22 of the bracing conduit 22 lies between 20 and 45 mm. In Figs. 1 and 2, two bracing conduits 22 are provided in the circumferential direction of the cylinder 01, however, the upper bracing conduit 22 is shown in dashed lines [only sketched in] for reasons of clarity.

[024] In this first preferred [exemplary] embodiment, the distribution conduit 17 is embodied as a spiral groove 17 in the axial direction A on a circumference 24 of the cylinder base body 02. This spirally turning groove 17 of a width b17 and a depth h17 is covered by [means of] the outer cylinder body 03, for example by having body 03 [being] shrunk on[, wherein the]. The inner surface 23 of the outer cylinder body 03 rests on a protrusion 26 forming the groove 26, for example a strip 26 of a width b26.

[025] The distribution conduit or spiral groove 17 is connected, at its start 27, with the distributing chamber 16 and at its end with the collecting chamber 18. The distributing chamber 16 and the collecting chamber 18 are, for example, each designed as an annular groove 16, 18, each of which is formed by a shoulder on the circumference of the area of the journals 04, 06 near the cylinder base body and a front face of the cylinder base body 02, and is also covered by the outer cylinder body 03.

[026] In the case of a forme cylinder 01 of double-sized circumference, i.e. two printing formats in the circumferential direction, the diameter of the forme cylinder 01 is, for example, between 320 and 400 mm, in particular 360 to 380 mm.

[027] The depth h17 and width b17 of the distribution conduit or groove 17, as well as the width b26 of the strip 26, and the number of distribution conduits 17 determine the flow-through amount of tempering medium per unit of time, and alternatingly the required pressure as well as the lead of the spiral groove 17, and therefore the tempering behavior.

[028] In an advantageous embodiment, the circumference 24 of the cylinder base body 02 has several, for example four or eight, distribution conduits or grooves 17 starting in the distributing chamber 16 and ending in the collecting chamber 18. The [, the] starts 27 and ends 28 of each of these distribution conduits 17 are offset by 90° or 45° in the circumferential direction. In this way, with the same conduit geometry a multiplex-threaded, for example quadruply- or octuply-threaded groove 17, has an increased total cross section Q, i.e. the sum of the cross sections of the individual distribution conduits 17, and an increased lead S, and therefore also a reduced flow

path and lesser pressure loss.

[029] In the example, the circumference 24 of the cylinder base body 02 has a quadruply-threaded distribution conduit 17, wherein the width b17 of the distribution conduit or groove 17 respectively lies between 10 and 20 mm, for example at 15 mm, and the width b26 of the strip 26 respectively lies between 3 and 7 mm, for example at 5 mm. The depth h17 of the distribution conduit 17 is respectively 10 to 15 mm, for example 12 mm. The quadruply-threaded distribution conduit 17 therefore has a lead S of, for example, 52 to 108 mm, in particular of 80 mm.

[030] A total cross section Q for the flow of the tempering medium is advantageously 600 to 800 mm². If increasing the wall thickness h03 of the outer cylinder body 03, while at the same time retaining the cylinder diameter d01 and reducing the inner radius r17 of the spiral distribution conduit or groove 17, the depth h17 of the conduit or groove 17 must be increased at the same ratio as the inner radius r17 of the conduit or groove 17 is reduced, so that the total cross section Q remains at least at the order of magnitude, for example greater than or equal to 710 mm². In this way, the supply to, or removal of heat from a shell surface 21 of the forme cylinder 01

remains assured. For the determination of the total cross section Q, the approximate inner radius r17 should be applied for depths h17 which are small in comparison with the inner radius r17, otherwise as usual the inner radius r17 plus half the depth h17.

The ratio between the tempered shell surface 21 and the total cross section Q lies for example between 1000 and 1800 [mm²].

[031] In a second preferred [exemplary] embodiment, as depicted in Fig. 3, [(Fig. 3)] of a forme cylinder 01, the distribution conduit 17 is produced, not as a spiral groove 17, but as an open gap 17 with an annular clear profile between the cylinder base body 02 and the outer cylinder body 03. The supply and removal of the tempering medium takes place in the same or similar way as in the first preferred [exemplary] embodiment, shown in Fig. 1 [(Fig. 1)]. In place of the radially extending bores 19, 14, the journal 04, 06 [08] is embodied in several pieces and in this way permits the penetration of the tempering medium from the supply line 12 into the distributing chamber 16, or from the collection chamber 18 to the removal line 13. In the second preferred [exemplary] embodiment, the supply line 12 is embodied in a two to four [two-] piece manner, wherein a supply conduit 12 penetrating the journal 04 terminates in a

conduit leading through the cylinder base body 02.

[032] The clearance h_{17} of the distribution conduit [gap] 17, together with an inner radius r_{17} of the rotary shaft of the cylinder 01 on which the [gap] distribution conduit [17] is arranged, determines the flow conditions and therefore also the tempering behavior. Too narrow a clearance increases the required pressure, or reduces the amount of flow-through, while too [to] large a clearance might not result in the assured direction of the flow directly onto the surface 23 of the outer cylinder body 03 because of high centrifugal forces occurring and friction occurring in the area of the surface 23 in the course of the rotation of the cylinder.

[033] In an advantageous embodiment of a forme cylinder 01, the gap of the distribution conduit 17 is arranged at the inner radius r_{17} of 80 to 120 mm, in particular between 100 and 115 mm. The clearance h_{17} of the gap is between 2 to 5 mm, preferably 3 mm. The wall thickness h_{03} of the outer cylinder body 03 is designed to be between $h_{03} = 40$ mm and $h_{03} = 70$ mm, in particular between 55 and 65 mm. In this embodiment of the tempering device, the outer cylinder body 03 should be designed to be self-supporting over a length l_{01} , for example $l_{01} = 800$ to 1200 mm, of

the barrel of the cylinder 01, or a length l_{03} , for example $l_{03} = 800$ to 1200 mm, of the outer cylinder body 03. Thus, with a depth h_{22} of the bracing conduit 22 between 20 and 45 mm, a sufficient strength of the outer cylinder body 03 remains in the area of the bracing conduit 22. As in the first preferred [exemplary] embodiment, the clearance h_{17} of the gap should be increased in an advantageous manner at the ratio of a reduction of the inner radius r_{17} if the wall thickness h_{03} is increased and the gap in the distribution conduit 17 is moved further into the interior of the cylinder 01, and vice versa. For example, the total cross section Q lies between 1300 and 3500 mm². The ratio between the shell surface 21 to be tempered and the total cross section Q of the conduit 17 lies, in this embodiment, between 300 and 900 [mm²], for example, and in particular between 500 and 650 [mm²]. The remaining preferred dimensions of the forme cylinder 01 explained in the first preferred [exemplary] embodiment should also be employed with the second preferred [exemplary] embodiment and will not be stated again.

[034] In [a] third and a fourth preferred embodiments, as shown in [exemplary embodiment ([Figs. 4 and 6])], the cylinder 01 is embodied as a temperable roller 01,

for example an inking roller 01, and in particular a screen roller 01 or an anilox roller 01.

The supply and removal of the tempering medium, as well as the seating in lateral walls 08, 09 takes place in the same or similar manner as in the first or second preferred [exemplary] embodiments.

[035] In the third preferred [exemplary] embodiment, which is shown in Fig. 4,

[(Fig. 4)] a spiral-shaped, multiplex-threaded, preferably octuply-threaded, distribution conduit 17 is arranged on the circumference 24 of the cylinder base body 03, in the same manner as in the first preferred [exemplary] embodiment. The distributing chamber 16 and the collecting chamber 18 each have eight radial bores 14, 19 and are connected, equidistant in relation to the circumferential direction, with eight starts 27 and eight ends 28 respectively, of the octuply-threaded distribution conduit or conduits 17. In the example, the distribution conduits 17 have been embodied as grooves 17, each with a segment-like, for example with a semicircular profile, for advantageous mechanical and satisfactory flow properties.

[036] The multiplex-threaded distribution conduit 17 is embodied in an advantageous manner as octuply-threaded, since it is possible with the same geometry

of the conduit 17 to either conduct twice the amount of tempering medium at a steady pressure loss through the conduit 17, or the same amount of tempering medium at a reduced pressure.

[037] As in the first exemplary embodiment, the groove 17 is covered by [means of] the outer cylinder body 03, which is, for example, shrunk on. Tempering, by use [means] of the spiral-shaped distribution conduit or groove 17, is particularly advantageous in case an effective and fast reacting tempering of the outer cylinder body 03 is required, such as is represented by ink-conducting inking rollers 01 and screen_rollers 01. The less the wall thickness h_{03} of the outer cylinder body 03, as shown in Fig. 5 [(Fig. 5)], the faster the reaction on the shell surface 21 takes place in case of a change of the operating temperature. In the example, the outer cylinder body 03 is made with a very small wall thickness h_{03} and is not self-supporting, i.e. it is supported on strips 26. The width of the groove 17 determines the mechanically still permissible wall thickness h_{03} of the outer cylinder body 03, and vice versa. The permissible width b_{26} of the strip 26 and the minimum wall thickness h_{03} determine each other mutually, since a temperature profile on the shell surfaced 21 of the outer

cylinder body 03 should be avoided if possible.

[038] In an advantageous embodiment, the temperable roller 01 has a diameter d_{01} between 160 and 200 mm, in particular 180 mm. The wall thickness h_{03} of the outer cylinder body 03 is 1 to 4 mm, for example $h_{03} = 2$ mm (not counting a coating of a total of 200 to 400 μm possibly to be applied), the length l_{03} of the outer cylinder body 03 lies between 800 and 1200 mm. A ratio V between the length l_{03} and the wall thickness h_{03} lies, for example, between 1:200 and 1:1200 [200 and 1200 mm], in particular between 1:400 and 1:1000 [400 and 1000 mm]. In the area which acts together with the surface 23 of the outer cylinder body 03, the strip 26 has a width b_{26} of 2 to 4 mm, in particular $b_{26} = 3$ mm. In the area which acts together with the surface 23 of the outer cylinder body 03, the conduit 17 has a width b_{17} between 8 and 13 mm, in particular 10 to 12 mm. In the example, the profile of the conduit 17 is semicircular-shaped, so that a maximum depth h_{17} of the conduit 17 is 4 to 7 mm, in particular $h_{17} = 5$ mm. The total cross section of the octuply- threaded distribution conduit or conduits 17 comes to 300 to 450 mm^2 , and can be approximately compared to the total cross section Q in the quadruply-threaded first preferred [exemplary] embodiment, if the shell

surface 21 to be cooled is taken into consideration. Here, too, an increase of the amount of tempering medium flowing per unit of time and, if possible, of a contact surface of the tempering medium with the surface 23 of the outer cylinder body 03, should at least be kept at an order of magnitude where the geometries of the roller 01 change while the shell surface 21 to be cooled remains the same. The ratio between the shell surface 21 to be tempered and the total cross section Q lies, for example, between 1:1200 and 1:1600 [1200 and 1600 mm²].

[039] In the fourth preferred [exemplary] embodiment, which is depicted in Fig. 6 [(Fig. 6)], the cylinder 01 embodied as a roller 01 has a gap 17, which is annular in profile, as the distribution conduit 17, in a manner comparable with the second preferred [exemplary] embodiment. As in the third preferred [exemplary] embodiment, the roller 01 has a diameter d01 of approximately 160 to 200 mm. The[, wherein the] supply and the removal of the tempering medium is designed in accordance with one of the previous preferred [exemplary] embodiments.

[040] In contrast to the third preferred [exemplary] embodiment, the outer

cylinder body 03 [here] is embodied to be self-supporting over the length l01 of, for example 800 to 120 mm, and has a wall thickness h03 of 5 to 20 mm, for example, and in particular of 5 to 9 mm. The clearance h17 of the distribution conduit or gap 17 is 2 to 5 mm, preferably 3 mm, wherein the distribution conduit or gap 17 is arranged on an inner radius of 60 to 100 mm, in particular 80 mm. The total cross section Q through which flow occurs lies, for example, between 1000 and 2500 mm², in particular at approximately 1500 mm². The ratio between the shell surface 21 to be tempered and the total cross section Q of the conduit 17 lies, for example, between 200:1 and 600:1 [200 and 600 mm²], in particular between 300:1 and 500:1 [300 and 500 mm²].

[041] The roller 01, preferably designed as a screen roller 01, from the third and the fourth preferred [exemplary] embodiments can have profiling on its shell surface 21, such as, for example, ink-conducting small cups. The [On the] shell surface 21 of the outer cylinder body 03 [it] can preferably have a chromium-nickel coating and a ceramic coating, each of a thickness of 100 to 200 µm, wherein the latter has the profiling, or the small cups.

[042] It is advantageous for the embodiments of tempering by use [means] of a

spiral-shaped conduit 17, to select the ratio between the shell surface 21 to be tempered and the total cross section Q of the distribution conduit 17 between the cylinder base body 02 and the outer cylinder body 03 through which a flow occurs to be less than 1:2000 [2000 mm²], in particular between 1:1800 and 1:1000 [1800 and 1000 mm²]. In an advantageous manner, the width b26 of the strip is less than or equal to twice, and in particular one and one half times, the wall thickness h03 of the outer cylinder body 03.

[043] The design of the outer cylinder body 03 is particularly advantageous, wherein it is a thin-walled tube 03 of a wall thickness d03 less than or equal to 5 mm, in particular less than 3 mm, which is mechanically supported on the strips 26, which are spaced apart in the axial direction A.

[044] The arrangement for tempering represented in the third preferred [exemplary] embodiment can, in an advantageous further development, also be a forme cylinder, which has no fastening device embodied as clamping or bracing conduits, such as is the case, for example, when using printing sleeves in place of printing plates, or with shell surfaces 21 of forme cylinders 01, on which images are directly placed.

There, too, a directed, fast reacting tempering in accordance with the third preferred
[exemplary] embodiment is then also advantageous.

[045] While preferred embodiments of a cylinder for a rotary printing press in
accordance with the present invention have been set forth fully and completely
hereinabove, it will be apparent to one of skill in the art that various changes in, for
example, the specific type of printing press used, the drive for the cylinders and the like
could be made without departing from the true spirit and scope of the present invention
which is accordingly to be limited only by the following claims.

WHAT IS CLAIMED IS:

[List of Reference Symbols

01 Cylinder, forme, transfer cylinder, roller, inking,

screen, anilox roller

02 Cylinder base body (01)

03 Outer cylinder body (01)

04 Journal (02)

05 -

06 Journal (02)

07 Bearing

08 Lateral frame

09 Lateral frame

10 -

11 Axial bore

12 Supply line, conduit

13 Removal line

14 Bore, radial]

[15 -

16 Annular groove, distributing chamber

17 Conduit, groove, gap

18 Collecting chamber, annular groove

19 Bore, radial

20 -

21 Shell surface (03)

22 Fastening device, bracing conduit

23 Surface (03)

24 Circumference (02)

25 -

26 Protrusion, strip

27 Start (17)

28 End (17)

b17 Width (17)]

[b26 Width (26)

d01 Diameter (01)

d11 Inner diameter (11)

d12 Outer diameter (12)

h02 Wall thickness (02)

h03 Wall thickness (03)

h17 Depth, clearance (17)

h22 Depth (22)

l01 Length (01)

l03 Length (03)

r17 Inner radius (17)

A Axial direction (01)

Q Total cross section

S Lead

V Ratio (l03, h03)]

JAN MCLIN CLAYBERG

PATENT AND TECHNICAL TRANSLATION

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DECLARATION

The undersigned, Olaf Bexhoeft, hereby states that he is well acquainted with both the English and German languages and that the attached is a true translation to the best of his knowledge and ability of the German text of PCT/DE00/03489, filed on 10/05/2000 and published on 04/19/2001 as WO 01/26903 A1, and of seven amended pages of specification and two pages of amended claims.

The undersigned further declares that the above statement is true; and further, that this statement was made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or document or any patent resulting therefrom.



Olaf Bexhoeft

10089071-040802

WO 01/26902

6/pt/7

PCT/EP00/03489

Specification

Cylinder for a Rotary Press

The invention relates to a cylinder in accordance with the preamble of claim 1 or 6.

A temperable cylinder for a rotary printing press is known from DE 197 12 446 A1, wherein a heat exchanger consisting of several tubes is arranged inside a hollow chamber of the cylinder and in turn is surrounded by a heat-transferring stationary fluid.

EP 0 557 245 A1 discloses a temperable forme cylinder with a clamping conduit extending axially over the jacket surface, wherein conduits extending axially in respect to the cylinder have been cut into the cylinder in the vicinity of the periphery, through which coolant flows.

EP 0 733 478 B1 shows a friction roller embodied as a tube, wherein coolant flows through the entire hollow space between an axial conduit, through which coolant is conducted, and the tube.

A temperable double-jacket drying cylinder is known from DE-PS 929 830. Steam flows in the space between an outer jacket and an inner jacket, into which ribs have been cut in a spiral pattern.

The object of the invention is based on creating a cylinder of a rotary printing press.

In accordance with the invention, this object is attained by means of the characteristics of claims 1 or 6.

The advantages which can be achieved by means of the invention lie primarily in that a temperable cylinder can be produced in a cost-effective manner from simple components. By means of this a pre-selectable temperature is achieved, which is

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almost evenly distributed over the entire jacket surface of the cylinder. A temperature profile which fluctuates in the circumferential direction or is uneven, such as can occur, for example, in connection with individual axially extending conduits and/or with wall thicknesses which are too small in comparison with the distance of the conduits, is avoided.

In an advantageous embodiment a chamber through which a tempering medium is conducted is of such dimensions in the radial direction on the inside of the cylinder jacket, that a forced flow also takes place directly on the jacket surface.

A low wall thickness of the outer body separating the jacket surface and the tempering medium is particularly advantageous in respect to the fastest possible reaction time of the tempering process, for example for inking rollers, in particular screen or anilox rollers, or for forme, transfer or satellite cylinders without a device for fastening dressings, such as bracing or clamping conduits, extending radially into the interior of the jacket surface.

In a preferred embodiment a wall thickness of a temperable forme or transfer cylinder having one or several clamping or bracing conduits on its shell surface is so great that the clamping conduit comes to lie entirely inside the wall.

Tempering which is even in the circumferential and the axial directions is achieved by means of a tempering medium flowing in the axial direction through a narrow gap between the outer body and the base body of the cylinder on the entire circumference.

In a further advantageous embodiment, an even more strongly directed flow is generated by means of a groove extending spirally on the outer surface of the base body.

Cooling by means of the above mentioned spiral conduit is furthermore advantageous, in particular for screen or anilox rollers, wherein the outer body is supported on the strips and is therefore constructed with thin walls.

Exemplary embodiments of the invention are represented in the drawings and will be described in greater detail in what follows:

Shown are in:

Fig. 1, a longitudinal sectional view through a temperable cylinder, which has a device for fastening a dressing and with a spirally extending conduit,

Fig. 2, a cross section through a temperable cylinder in accordance with Fig. 3,

Fig. 3, a longitudinal sectional view through a temperable cylinder, which has a device for fastening a dressing and with a gap between the base body and the outer body,

Fig. 4, a longitudinal sectional view through a temperable, thin-walled cylinder with a spirally extending conduit,

Fig. 5, a cross section through a temperable cylinder in accordance with Fig. 4,

Fig. 6, a longitudinal sectional view through a temperable cylinder with a gap between the base body and the outer body.

A temperable cylinder 01 of a printing press, in particular a rotary printing press, has a cylinder base body 02, for example of a tube-shape or solid, which is surrounded by an outer cylinder body 03 of a circular cross section, for example a tube 03.

On its ends, the cylinder base body 02 is fixedly connected with respective journals 04, 06, which are rotatably seated by means of bearings 07 in lateral frames 08, 09. It is possible to connect one of the journals 04, 06, for example the right journal

06, with a drive motor or a drive wheel, not represented, fixed in place on the frame.

The other journal 04 has an axial bore 11, which receives a conduit 12 as the feed line 12 for a liquid or gaseous tempering medium, for example CO₂, water, oil, etc. In an advantageous embodiment, the axial bore 11 of the journal 04 has an interior diameter d11 which is greater than an exterior diameter d12 of the conduit 12. Therefore a removal line 13 of a circular cross section remains open in the area of the journal 04 and around the conduit 12, through which the tempering medium leaves the cylinder 01 again via the journal 04. The conduit 12 for supplying the tempering medium extends from the left journal 04 almost axially through the cylinder base body 02 as far as the right journal 06 and terminates in radially extending bores 14. The bores 14 terminate in a distributing chamber 16, which extends around the entire circumference on the inside of the outer cylinder body 03. From the distributing chamber 16 the tempering medium flows in the axial direction A through at least one conduit 17 arranged between the cylinder base body 02 and the outer cylinder body 03 to the left journal 04, where it terminates in a collecting chamber 18 and reaches the ring-shaped removal line 13 via radially extending bores 19.

The supply line 12 and the removal line 13 are connected with the removal and supply flow of a tempering device, not represented.

It is provided by an embodiment variation, not represented, to provide the supply and removal of the tempering medium separately via the respective journals 04, 06.

In a first exemplary embodiment (Fig. 1), the cylinder 01 is embodied as a forme cylinder 01 or transfer cylinder 01 which,

on a shell surface 21 of the outer cylinder body 03, has at least one fastening device 22, for example a bracing conduit 22, a magnet close to the shell surface, or other means, extending axially in respect to the cylinder 01, for fastening a dressing, for example a printing forme or a rubber blanket. The wall thickness h_{03} of the outer cylinder body 03 is greater than the depth h_{22} of the bracing conduit 22, so that an uninterrupted and circular surface 23 is formed on the inside of the outer cylinder body 03, which makes possible a cost-effective construction and above all even tempering. The wall thickness h_{03} lies, for example, between 40 and 70 mm, in particular between 55 and 65 mm, wherein the depth h_{22} of the bracing conduit 22 lies between 20 and 45 mm. In Figs. 1 and 2 two bracing conduits 22 are provided in the circumferential direction of the cylinder 01, however, the upper bracing conduit 22 is only sketched in for reasons of clarity.

In this exemplary embodiment the conduit 17 is embodied as a spiral groove 17 in the axial direction A on a circumference 24 of the cylinder base body 02. This spirally turning groove 17 of a width b_{17} and a depth h_{17} is covered by means of the outer cylinder body 03, for example by being shrunk on, wherein the surface 23 of the outer cylinder body 03 rests on a protrusion 26 forming the groove 26, for example a strip 26 of a width b_{26} .

The groove 17 is connected at its start 27 with the distributing chamber 16 and at its end with the collecting chamber 18. The distributing chamber 16 and the collecting chamber 18 are for example each designed as an annular groove 16, 18, each of which is formed by a shoulder on the circumference of the area of the journals 04, 06 near the cylinder base body and a front face

of the cylinder base body 02, and is also covered by the outer cylinder body 03.

In the case of a forme cylinder 01 of double-sized circumference, i.e. two printing formats in the circumferential direction, the diameter of the forme cylinder 01 is for example between 320 and 400 mm, in particular 360 to 380 mm.

The depth h17 and width b17 of the groove 17, as well as the width b26 of the strip 26, and the number of conduits 17 determine the flow-through amount per unit of time, and alternately the required pressure as well as the lead of the spiral groove 17, and therefore the tempering behavior.

In an advantageous embodiment, the circumference 24 of the cylinder base body 02 has several, for example four or eight, grooves 17 in the distributing chamber 16 and the collecting chamber 18, the starts 27 and ends 28 of each are offset by 90° or 45° in the circumferential direction. In this way, with the same conduit geometry a multiplex-threaded, for example quadruply- or octuply-threaded groove 17, has an increased total cross section Q, i.e. the sum of the cross sections of the conduits 17, and an increased lead S, and therefore also a reduced flow path and lesser pressure loss.

In the example, the circumference 24 of the cylinder base body 02 has a quadruply-threaded conduit 17, wherein the width b17 of the groove 17 respectively lies between 10 and 20 mm, for example at 15 mm, and the width b26 of the strip 26 respectively between 3 and 7 mm, for example at 5 mm. The depth h17 of the conduit 17 is respectively 10 to 15 mm, for example 12 mm. The quadruply-threaded conduit 17 therefore has a lead S of, for example, 52 to 108 mm, in particular of 80 mm.

A total cross section Q for the flow of the tempering medium is advantageously 600 to 800 mm². If increasing the wall thickness h_{03} of the outer cylinder body 03, while at the same time retaining the cylinder diameter d_{01} and reducing the inner radius r_{17} of the spiral groove 17, the depth h_{17} of the groove 17 must be increased at the same ratio as the inner radius r_{17} of the groove 17 is reduced, so that the total cross section Q remains at least at the order of magnitude, for example greater than or equal to 710 mm². In this way the supply to, or removal of heat from a shell surface 21 of the forme cylinder 01 remains assured. For the determination of the total cross section Q , the approximate inner radius r_{17} should be applied for depths h_{17} which are small in comparison with the inner radius r_{17} , otherwise as usual the inner radius r_{17} plus half the depth h_{17} . The ratio between the tempered shell surface 21 and the total cross section Q lies for example between 1000 and 1800 mm².

In a second exemplary embodiment (Fig. 3) of a forme cylinder 01, the conduit 17 is produced not as a spiral groove 17, but as an open gap 17 with an annular clear profile between the cylinder base body 02 and the outer cylinder body 03. The supply and removal of the tempering medium takes place in the same or similar way as in the first exemplary embodiment (Fig. 1). In place of the radially extending bores 14, the journal 04, 08 is embodied in several pieces and in this way permits the penetration of the tempering medium from the supply line 12 into the distributing chamber 16, or from the collection chamber 18 to the removal line 13. In the exemplary embodiment, the supply line 12 is embodied in a two to four two-piece manner, wherein a conduit 12 penetrating the journal 04 terminates in a conduit leading through the cylinder base body 02.

The clearance h_{17} of the gap 17, together with an inner radius r_{17} of the rotary shaft of the cylinder 01 on which the gap 17 is arranged, determines the flow conditions and therefore also the tempering behavior. Too narrow a clearance increases the required pressure, or reduces the amount of flow-through, while too large a clearance might not result in the assured direction of the flow directly onto the surface 23 of the outer cylinder body 03 because of high centrifugal forces occurring and friction occurring in the area of the surface 23 in the course of the rotation of the cylinder.

In an advantageous embodiment of a form cylinder 01, the gap 17 is arranged at the inner radius r_{17} of 80 to 120 mm, in particular between 100 and 115 mm. The clearance h_{17} of the gap is between 2 to 5 mm, preferably 3 mm. The wall thickness h_{03} of the outer cylinder body 03 is designed to be between $h_{03} = 40$ mm and $h_{03} = 70$ mm, in particular between 55 and 65 mm. In this embodiment of the tempering device, the outer cylinder body 03 should be designed to be self-supporting over a length l_{01} , for example $l_{01} = 800$ to 1200 mm, of the barrel of the cylinder 01, or a length l_{03} , for example $l_{03} = 800$ to 1200 mm, of the outer cylinder body 03. Thus, with a depth h_{22} of the bracing conduit 22 between 20 and 45 mm, a sufficient strength of the outer cylinder body 03 remains in the area of the bracing conduit 22. As in the first exemplary embodiment, the clearance h_{17} of the gap should be increased in an advantageous manner at the ratio of a reduction of the inner radius r_{17} if the wall thickness h_{03} is increased and the gap 17 is moved further into the interior of the cylinder 01, and vice versa. For example, the total cross section Q lies between 1300 and 3500 mm². The ratio between the shell surface 21 to be tempered and the total cross section Q of the

conduit 17 lies in this embodiment between 300 and 900 mm², for example, and in particular between 500 and 650 mm². The remaining preferred dimensions of the forme cylinder 01 explained in the first exemplary embodiment should also be employed with the second exemplary embodiment and will not be stated again.

In a third and a fourth exemplary embodiment (Figs. 4 and 6), the cylinder 01 is embodied as a temperable roller 01, for example an inking roller 01, in particular a screen roller 01 or anilox roller 01. The supply and removal of the tempering medium, as well as the seating in lateral walls 08, 09 takes place in the same or similar manner as in the first or second exemplary embodiments.

In the third exemplary embodiment (Fig. 4) a spiral-shaped, multiplex-threaded, preferably octuply-threaded, conduit 17 is arranged on the circumference 24 of the cylinder base body 03, the same as in the first exemplary embodiment. The distributing chamber 16 and the collecting chamber 18 each have eight radial bores 14, 19 and are connected, equidistant in relation to the circumferential direction, with eight starts 27 and eight ends 28. In the example, the conduits 17 have been embodied as grooves 17 with segment-like, for example semicircular profile, for advantageous mechanical and satisfactory flow properties.

The multiplex-threaded conduit 17 is embodied in an advantageous manner as octuply-threaded, since it is possible with the same geometry of the conduit 17 to either conduct twice the amount of tempering medium at a steady pressure loss through the conduit 17, or the same amount of tempering medium at a reduced pressure.

As in the first exemplary embodiment, the groove 17 is covered by means of the outer cylinder body 03, which is for

example shrunk on. Tempering by means of the spiral-shaped groove 17 is particularly advantageous in case an effective and fast reacting tempering of the outer cylinder body 03 is required, such as is represented by ink-conducting inking rollers 01 and screen rollers 01. The less the wall thickness h_{03} of the outer cylinder body 03 (Fig. 5), the faster the reaction on the shell surface 21 takes place in case of a change of the operating temperature. In the example, the outer cylinder body 03 is made with a very small wall thickness h_{03} and not self-supporting, i.e. it is supported on strips 26. The width of the groove 17 determines the mechanically still permissible wall thickness h_{03} of the outer cylinder body 03, and vice versa. The permissible width b_{26} of the strip 26 and the minimum wall thickness h_{03} determine each other mutually, since a temperature profile on the shell surface 21 of the outer cylinder body 03 should be avoided if possible.

In an advantageous embodiment the temperable roller 01 has a diameter d_{01} between 160 and 200 mm, in particular 180 mm. The wall thickness h_{03} of the outer cylinder body 03 is 1 to 4 mm, for example $h_{03} = 2$ mm (not counting a coating of a total of 200 to 400 μm possibly to be applied), the length l_{03} of the outer cylinder body 03 lies between 800 and 1200 mm. A ratio V between the length l_{03} and the wall thickness h_{03} lies, for example, between 200 and 1200 mm, in particular between 400 and 1000 mm. In the area which acts together with the surface 23 of the outer cylinder body 03, the strip 26 has a width b_{26} of 2 to 4 mm, in particular $b_{26} = 3$ mm. In the area which acts together with the surface 23 of the outer cylinder body 03, the conduit 17 has a width b_{17} between 8 and 13 mm, in particular 10 to 12 mm. In the example, the profile of the conduit 17 is semicircular-shaped, so that a maximum depth h_{17} of the conduit 17 is 4 to 7 mm, in

particular $h_{17} = 5$ mm. The total cross section of the octuply-threaded conduit 17 comes to 300 to 450 mm², and can be approximately compared to the total cross section Q in the quadruply-threaded first exemplary embodiment, if the shell surface 21 to be cooled is taken into consideration. Here, too, an increase of the amount of tempering medium flowing per unit of time and, if possible, of a contact surface of the temperature medium with the surface 23 of the outer cylinder body 03, should at least be kept at an order of magnitude where the geometries of the roller 01 change while the shell surface 21 to be cooled remains the same. The ratio between the shell surface 21 to be tempered and the total cross section Q lies, for example, between 1200 and 1600 mm².

In the fourth exemplary embodiment (Fig. 6), the cylinder 01 embodied as a roller 01 has a gap 17, which is annular in profile, as the conduit 17, comparable with the second exemplary embodiment. As in the third exemplary embodiment, the roller 01 has a diameter d_{01} of approximately 160 to 200 mm, wherein the supply and the removal of the tempering medium is designed in accordance with one of the previous exemplary embodiments.

In contrast to the third exemplary embodiment, the outer cylinder body 03 here is embodied to be self-supporting over the length l_{01} of, for example 800 to 120 mm, and has a wall thickness h_{03} of 5 to 20 mm, for example, in particular 5 to 9 mm. The clearance h_{17} of the gap 17 is 2 to 5 mm, preferably 3 mm, wherein the gap 17 is arranged on an inner radius of 60 to 100 mm, in particular 80 mm. The total cross section Q through which flow occurs lies, for example, between 1000 and 2500 mm², in particular at approximately 1500 mm². The ratio between the shell surface 21 to be tempered and the total cross section Q of the conduit 17

lies, for example, between 200 and 600 mm², in particular between 300 and 500 mm².

The roller 01, preferably designed as a screen roller 01, from the third and the fourth exemplary embodiments can have profiling on its shell surface 21, for example ink-conducting small cups. On the shell surface 21 of the outer cylinder body 03 it can preferably have a chromium-nickel coating and a ceramic coating, each of a thickness of 100 to 200 μm , wherein the latter has the profiling, or the small cups.

It is advantageous for the embodiments of tempering by means of a spiral-shaped conduit 17 to select the ratio between the shell surface 21 to be tempered and the total cross section Q of the conduit 17 between the cylinder base body 02 and the outer cylinder body 03 through which a flow occurs to be less than 2000 mm², in particular between 1800 and 1000 mm². In an advantageous manner the width b26 of the strip is less than or equal to twice, and in particular one and one half times, the wall thickness h03 of the outer cylinder body 03.

The design of the outer cylinder body 03 is particularly advantageous, wherein it is a thin-walled tube 03 of a wall thickness d03 less than or equal to 5 mm, in particular less than 3 mm, which is mechanically supported on the strips 26, which are spaced apart in the axial direction A.

The arrangement for tempering represented in the third exemplary embodiment can in an advantageous further development also be a forme cylinder, which has no fastening device, such as is the case, for example, when using printing sleeves in place of printing plates, or with shell surfaces 21 of forme cylinders 01, on which images are directly placed. There, too, a directed, fast

reacting tempering in accordance with the third exemplary embodiment is then also advantageous.

208040 T/068001

List of Reference Symbols

- 01 Cylinder, forme, transfer cylinder, roller, inking, screen, anilox roller
- 02 Cylinder base body (01)
- 03 Outer cylinder body (01)
- 04 Journal (02)
- 05 -
- 06 Journal (02)
- 07 Bearing
- 08 Lateral frame
- 09 Lateral frame
- 10 -
- 11 Axial bore
- 12 Supply line, conduit
- 13 Removal line
- 14 Bore, radial
- 15 -
- 16 Annular groove, distributing chamber
- 17 Conduit, grove, gap
- 18 Collecting chamber, annular groove
- 19 Bore, radial
- 20 -
- 21 Shell surface (03)
- 22 Fastening device, bracing conduit
- 23 Surface (03)
- 24 Circumference (02)
- 25 -
- 26 Protrusion, strip

27 Start (17)

28 End (17)

b17 Width (17)

b26 Width (26)

d01 Diameter (01)

d11 Inner diameter (11)

d12 Outer diameter (12)

h02 Wall thickness (02)

h03 Wall thickness (03)

h17 Depth, clearance (17)

h22 Depth (22)

l01 Length (01)

l03 Length (03)

r17 Inner radius (17)

A Axial direction (01)

Q Total cross section

S Lead

V Ratio (l03, h03)

Claims

1. A cylinder (01) of a rotary printing press which has a cylinder base body (02) and an outer cylinder body (03), through which a tempering medium can flow between the cylinder base body (02) and the outer cylinder body (03), characterized in that the circumference (24) of the cylinder base body (02) has a multiplex-threaded spiral-shaped conduit (17), and that the outer cylinder body (03) which conducts printing ink is not self-supporting over its length, is designed to be supported on the cylinder base body (02).

2. The cylinder (01) in accordance with claim 1, characterized in that the multiplex-threaded conduit (17) is embodied in the form of spiral-shaped grooves (17) with remaining strips (26) in the circumference (24) of the cylinder base body (02), which are covered by means of the outer cylinder body (03) supported on the strips (26).

3. The cylinder (01) in accordance with claim 1, characterized in that the conduit (17) is embodied to be octuply-threaded.

4. The cylinder (01) in accordance with claim 1, characterized in that a total cross section (Q) of the conduit (17) is designed at a ratio of 1:1200 to 1:1600 in respect to the shell surface (21) to be tempered.

5. The cylinder (01) in accordance with claim 2, characterized in that the ratio of a width (b26) of the strip (26) to the wall thickness (h03) of the outer cylinder body (03) is embodied to be less than or equal to 2, in particular less than or equal to 1.5.

6. A cylinder (01) of a rotary printing press which has a cylinder base body (02) and an outer cylinder body (03), through which a tempering medium can flow between the cylinder base body (02) and the outer cylinder body (03), characterized in that a gap (17) of an approximately circular profile, which extends in the axial direction (A), is embodied between the outer cylinder body (03) and the cylinder base body (02).

7. The cylinder (01) in accordance with claim 6, characterized in that the cylinder base body (02) and the outer cylinder body (03) are not supported on each other.

8. The cylinder (01) in accordance with claim 6, characterized in that a total cross section (Q) of the gap (17) is designed at a ratio of 1:200 to 1:600, in particular between 1:300 and 1:500, in respect to the shell surface (21) to be tempered.

9. The cylinder (01) in accordance with claim 6, characterized in that the gap (17) has a clearance (h17) of 2 to 5 mm.

10. The cylinder (01) in accordance with one of claims 1 or 6, characterized in that the cylinder (01) has a supply line (12) and a removal line (13) for the tempering medium.

11. The cylinder (01) in accordance with claim 10, characterized in that a journal (04, 06) has the supply line (12) as well as the removal line (13), which is arranged coaxially around the supply line (12).

12. The cylinder (01) in accordance with one of claims 1 or 6, characterized in that the cylinder (01) is designed as an inking roller (01).

13. The cylinder (01) in accordance with one of claims 1 or 6, characterized in that the cylinder (01) is designed as a screen roller (01).

14. The cylinder in accordance with claim 1, characterized in that the ratio (V) between a length (l03) and a wall thickness (h03) of the outer cylinder body (03) lies between 1:200 and 1:1200, in particular between 1:400 and 1:1000.

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— Vor Ablauf der für Änderungen der Ansprüche geltenden
Frist; Veröffentlichung wird wiederholt, falls Änderungen
eintreffen.

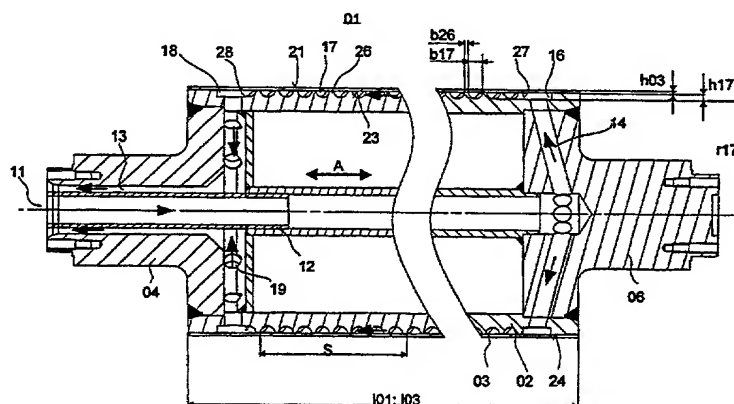
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Zur Erklärung der Zweibuchstaben-Codes, und der anderen
Abkürzungen wird auf die Erklärungen ("Guidance Notes on
Codes and Abbreviations") am Anfang jeder regulären Ausgabe
der PCT-Gazette verwiesen.

(54) Title: CYLINDER FOR A ROTARY PRESS

(54) Bezeichnung: ZYLINDER EINER ROTATIONSDRUCKMASCHINE



(57) Abstract: A cylinder (1), in particular an inking roller for a rotary press, comprises a base body (2) and an outer body (3). A tempering medium can flow between the base body and the outer body of said cylinder. The circumference (24) of the base body comprises a multiple helical channel (17). The outer body cylinder, which feeds the printing ink, is not self-supporting over the length thereof and is supported by the base body of the cylinder.

(57) Zusammenfassung: Zylinder (1), insbesondere Farbwalze für eine Rotationsdruckmaschine, welcher einen Zylindergrundkörper (2) und einen Zylinderaußenkörper (3) aufweist, und welcher zwischen dem Zylindergrundkörper und dem Zylinderaußenkörper von einem Temperiemedium durchströmbar ist, wobei der Umfang (24) des Zylindergrundkörpers einen mehrgängigen, schraubenlinienförmigen Kanal (17) aufweist und wobei der druckfarbeführende Zylinderaußenkörper über seine Länge nicht selbsttragend und sich auf dem Zylindergrundkörper abstützend ausgeführt ist.



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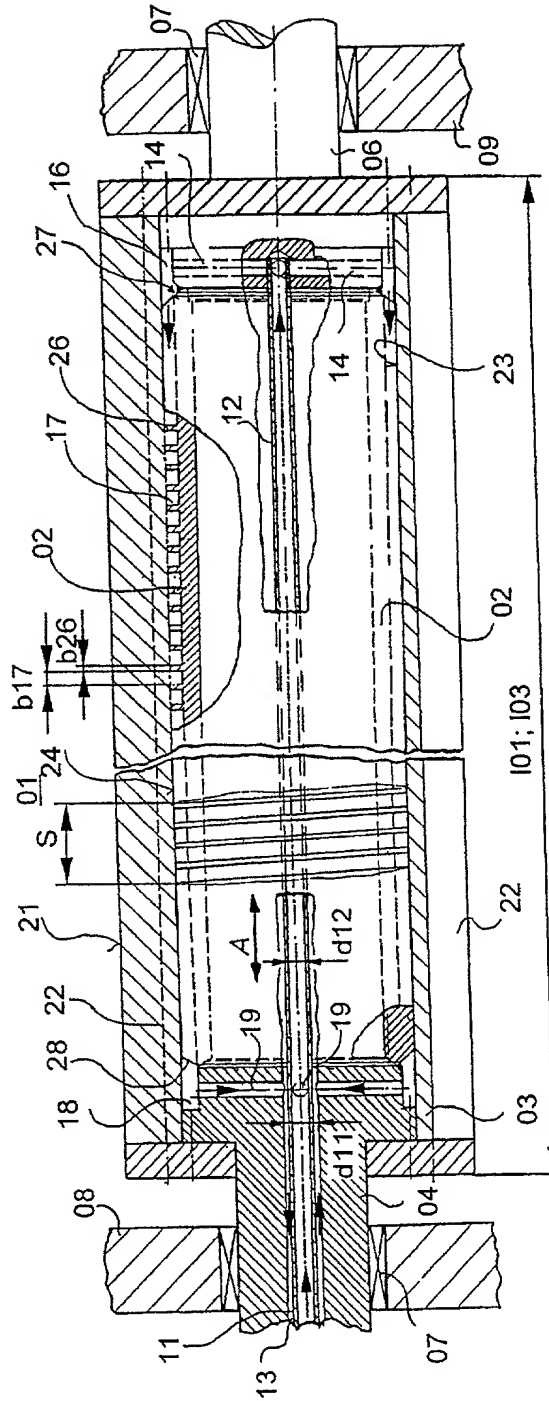


Fig. 1

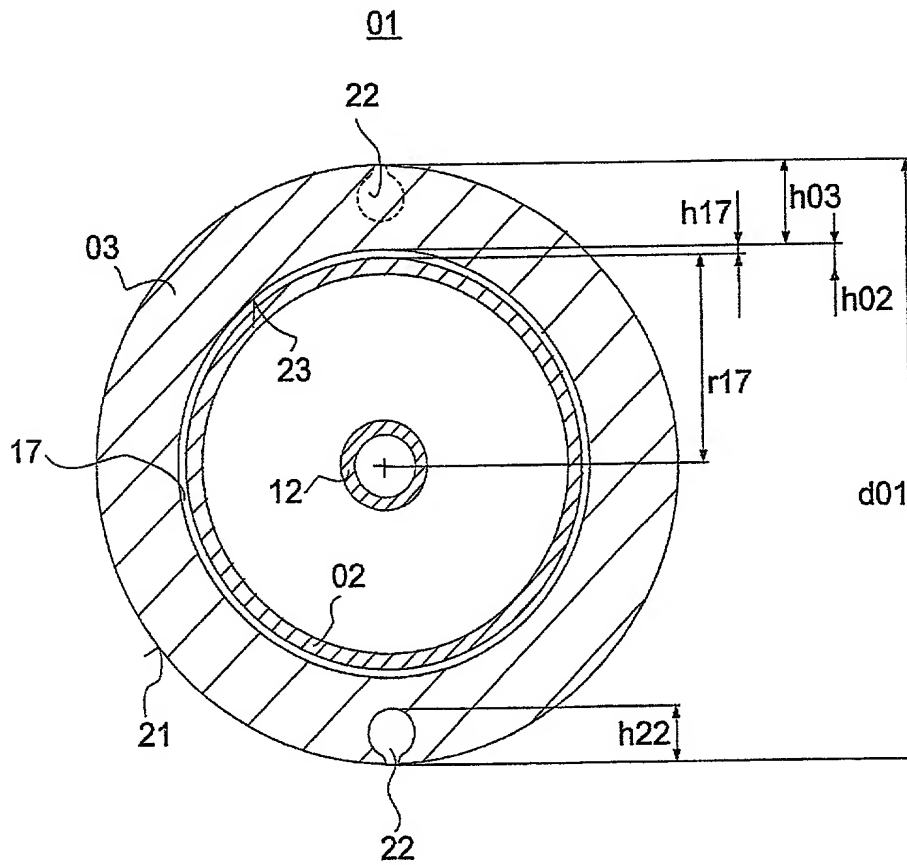


Fig. 2

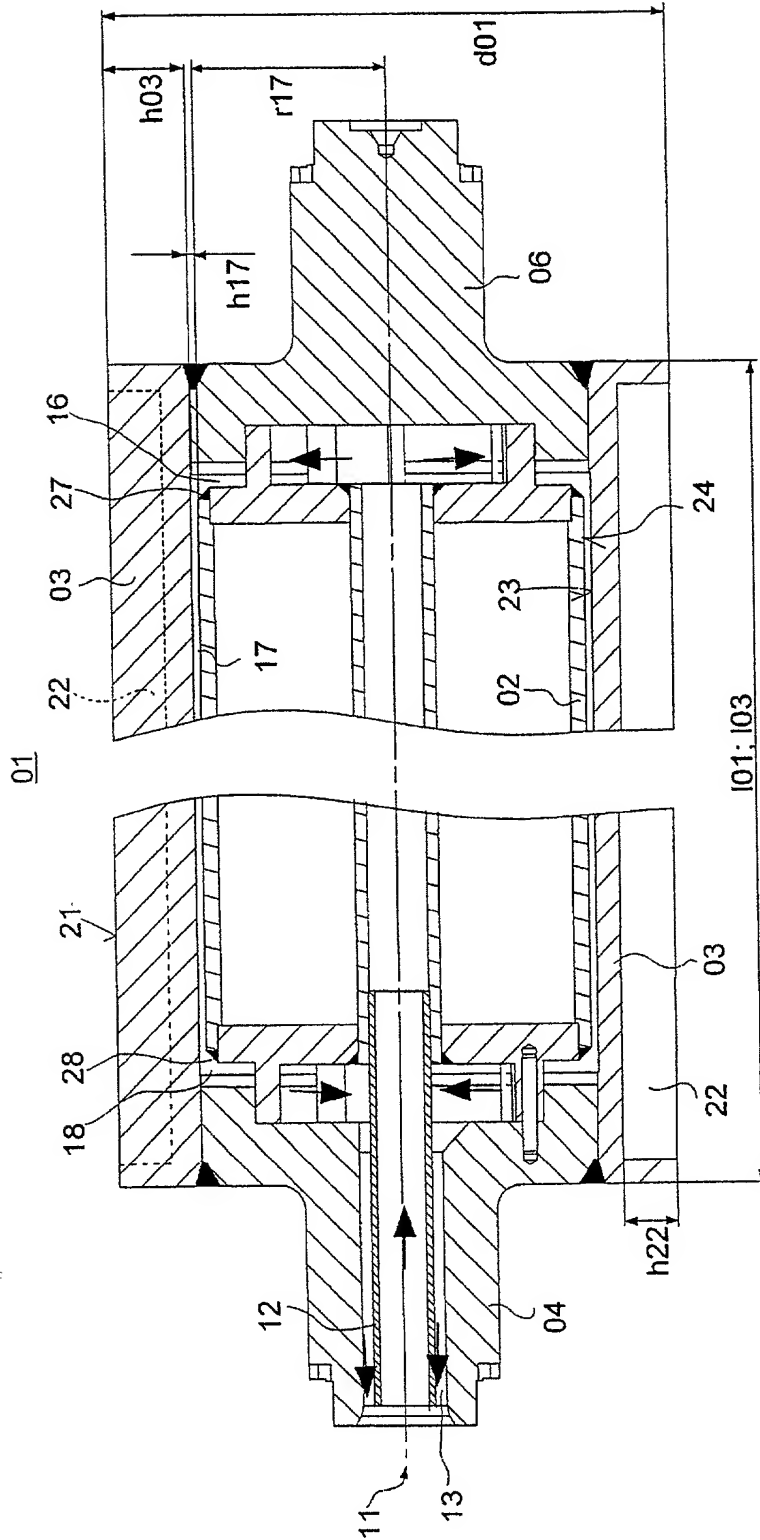


Fig. 3

01

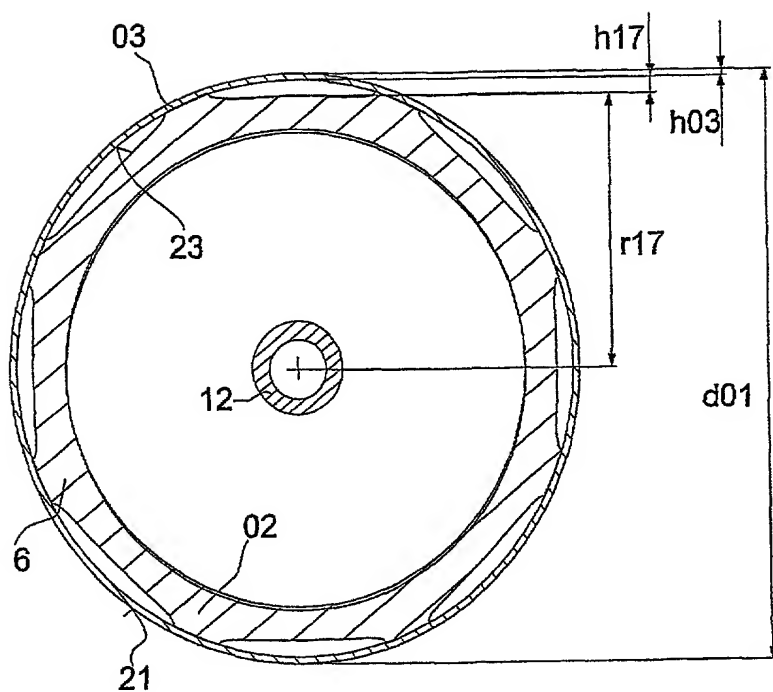


Fig. 5

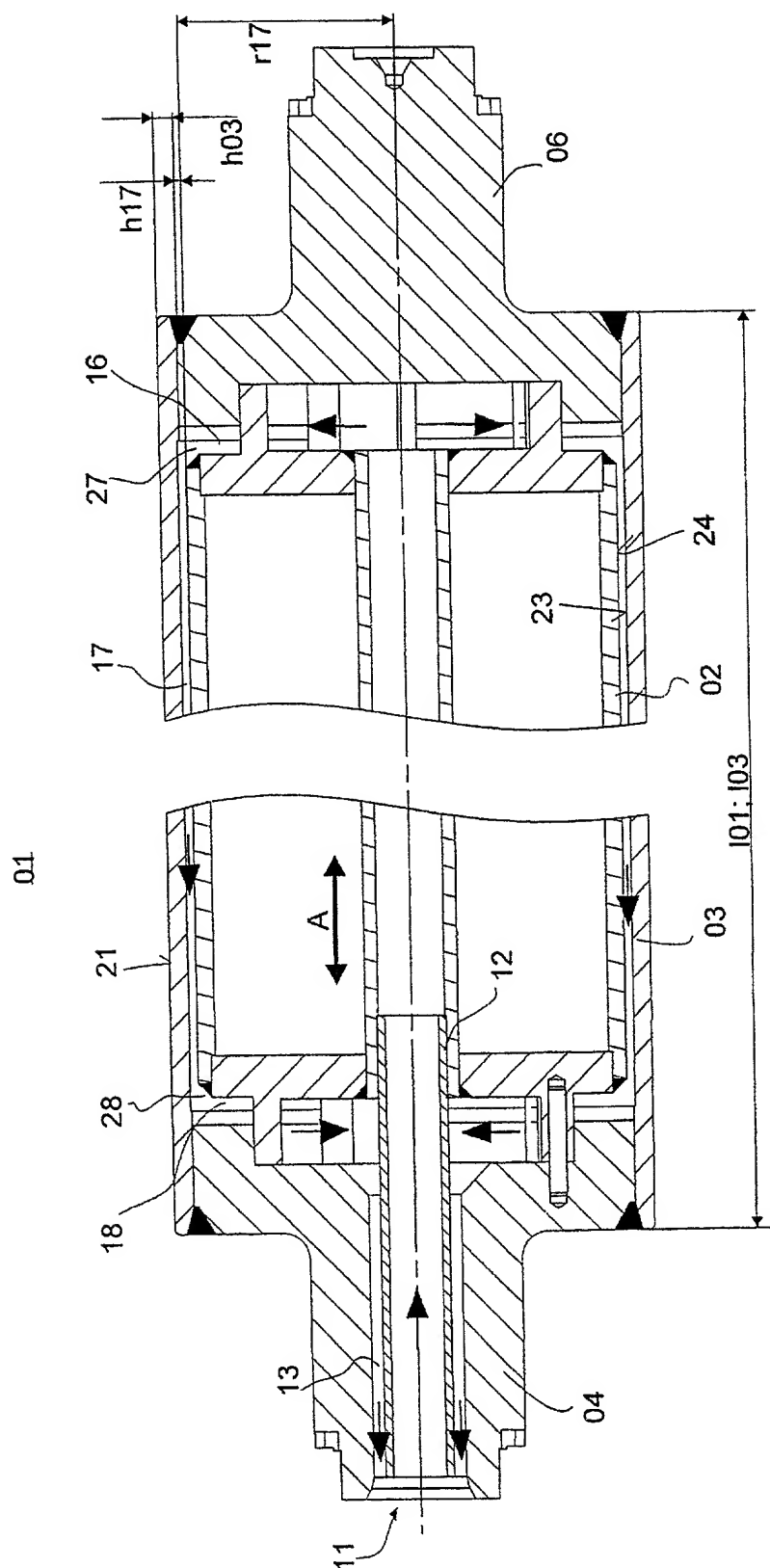


Fig. 6

COMBINED DECLARATION AND POWER OF ATTORNEY

As a below named inventor, I hereby declare that:

This declaration is of the following type:

- ☐ original
- ☐ design
- ☐ supplemental
- ☒ national stage of PCT
- ☐ divisional
- ☐ continuation
- ☐ continuation-in-part (CIP)

My residence, post office address and citizenship are as stated next to my name.

I believe I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed for and for which a patent is sought on the invention entitled:

CYLINDER FOR A ROTARY PRESS

the specification of which:

- ☐ is attached hereto
- ☐ was filed on _____ as
- ☐ Application Serial No. _____
- ☐ and was amended on _____
(If applicable)

☒ was described and claimed in PCT International application

No. PCT/DE00/03489 filed on October 5, 2000

and as amended under PCT Article 19 on _____ (if any).

I hereby state that I have reviewed and understand the contents of the above-identified specification, including the claims, as amended by any Amendment referred to above.

I acknowledge duty to disclose information which is material to patentability as defined in Title 37, Code of Federal Regulations, § 1.56.

☒ In compliance with this duty there is attached an information disclosure statement. 37 CFR § 1.97.

20080407 14:0800

I hereby claim foreign priority benefits under Title 35, United States Code, § 119, of any foreign application(s) for patent or inventor's certificate listed below and have also identified below any foreign application for patent or inventor's certificate having a filing date before that of the application on which priority is claimed:

- ☐ no such applications have been filed
☒ such applications have been filed as follows:

Prior Foreign Application(s)

<u>19948453.8</u> (Number)	<u>Germany</u> (Country)	<u>8/10/1999</u> (Day/month/year filed)	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No
<u> </u> (Number)	<u> </u> (Country)	<u> </u> (Day/month/year filed)	<input type="checkbox"/> Yes	<input type="checkbox"/> No

I hereby claim the benefit under Title 35, United States Code, § 119(e) of any United States Provisional application(s) listed below:

<u> </u> (Application Number)	<u> </u> (Filing Date)
<u> </u> (Application Number)	<u> </u> (Filing Date)

I hereby claim the benefit under Title 35, United States Code, § 120 of any United States application(s) listed below, insofar as the subject matter of each of the claims of this application is not disclosed in the prior United States application in the manner provided by the first paragraph of Title 35, United States Code, § 112, I acknowledge the duty to disclose all information known to Federal Regulations, § 1.56 which became available between the filing date of the prior application and the national or PCT international filing date of this application:

<u> </u> (Application No.)	<u> </u> Filing Date	<u> </u> (Patented, pending, abandoned)
<u> </u> (Application No.)	<u> </u> Filing Date	<u> </u> (Patented, pending, abandoned)

POWER OF ATTORNEY: As a named inventor, I hereby appoint the following attorney(s) and/or agents to prosecute this application and transact all business in the Patent and Trademark Office connected therewith.

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I hereby declare all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under § 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

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